IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Applicants:	Terry A. Clark *et al.*	Docket No:	EH-10660
Serial No:	10/063,900	Examiner:	Davis, Octavia L.
Filed:	22 May 2002	Art Unit:	2855
Title:	APPARATUS AND METHOD FOR PREVENTING INLET VORTEX	Date:	29 June 2004

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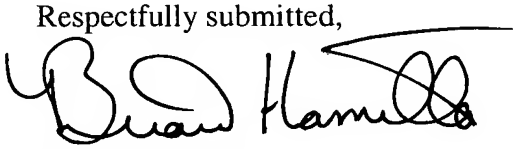
Sir:

APPEAL BRIEF

Appellants submit this Appeal Brief, in triplicate. Appellants authorize the Commissioner to charge the $330 fee set forth in 37 CFR § 1.17(c) for filing this Appeal Brief along with any other fees set forth in 37 CFR §§ 1.16 or 17 which may be required by this Appeal Brief, and to credit any overpayments, to **Deposit Account Number 21-0279.** In order to facilitate processing of the fees, Appellants provide a duplicate copy of this page.

Respectfully submitted,



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I. REAL PARTY IN INTEREST

United Technologies Corporation, the Assignee of this Application, is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

No other appeals or interferences are known to Appellants, Attorney for Appellants, or Assignee that will directly affect, be directly affected by, or have a bearing on the decision of the Board in this appeal.

III. STATUS OF CLAIMS

Claims 1, 3 and 5-22 are pending. Claims 2 and 4 were cancelled. Claims 1, 3 and 5-22 stand rejected. Appellants appeal the rejection of claims 1, 3 and 5-22 in the final Office Action dated 29 July 2003 ("Office Action"). Appendix A provides a copy of the appealed claims.

IV. STATUS OF AMENDMENTS

Appellants filed a Reply to the Office Action on 26 November 2003 ("Reply") to the Office Action that sought reconsideration of the rejections. The Reply did not amend the claims.

V. SUMMARY OF INVENTION

The present invention relates to an apparatus and method for preventing the formation of a vortex at the inlet of a gas turbine engine located on a tarmac (¶ 1[1]). To avoid the expense associated with removing an engine from an aircraft for testing, it is desirable to test the engine on-wing (¶ 5). At elevated power levels, however, operation of an engine on-wing can produce vortices between the

[1] Since Appellants electronically filed the application, Appellants cannot refer to the specification by page and line number. Instead, Appellants refer to the specification by paragraph number.

tarmac and the engine inlet (¶ 6). Such vortices, particularly when the aircraft remains static, can damage the engine due to compressor surge or foreign object ingestion (¶ 6).

The present invention is a ramp that can be placed on the tarmac adjacent the nacelle (¶ 44, Figure 3). In one embodiment, the ramp includes interconnected horizontal members, vertical members and angled members (¶ 42). The ramp has an inclined surface that facilitates the turning of the air adjacent the tarmac towards the engine inlet (¶ 44). The inclined surface extends at an angle of approximately 45° relative to the tarmac (¶43). The ramp has a preferred height that depends upon the engine geometry (¶ 46).

By preventing vortex formation, the ramp allows operation of the gas turbine engine at an elevated Engine Pressure Ratios (EPR) (¶ 40). In fact, the ramp could even allow operation of the gas turbine engine a full power. An EPR of approximately 1.65 is a typical full power setting for high bypass turbofan engines (¶40).

VI. ISSUES

Appellants present three (3) issues in this Appeal:

A. Issue 1: Whether the rejection in the Office Action of claims 1, 3, 5-11 and 17-20 under 35 USC § 112, first paragraph, as containing subject matter not sufficiently described in the specification was improper.

B. Issue 2: Whether the rejection in the Office Action of claims 1, 3, 6-9, 11-13 and 15-22 under 35 U.S.C. § 102(b) as being anticipated by United States Patent number 6,162,011 was improper.

C. Issue 3: Whether the rejection in the Office Action of claims 5, 10 and 14 under 35 U.S.C. § 103(a) as being unpatentable over United States Patent number 6,162,011 in view of United States Patent number 5,591,904was improper.

VII. GROUPING OF CLAIMS

Appellants group the claims as follows:

A. For Issue 1, claims 1, 3, 5-11 and 17-20 stand or fall together.

B. For Issue 2:

1. Claims 1, 3, 6, 7 and 17 stand or fall together;
2. Claims 8, 9 and 11 stand or fall together;
3. Claims 12, 13, 15 and 16 stand or fall together;
4. Claims 18 and 20 stand or fall together;
5. Claim 19 stands alone; and
6. Claims 21 and 22 stand or fall together.

C. For Issue 3, claims 5, 10 and 14 stand or fall together.

VIII. ARGUMENTS

A. Rejection Under 35 U.S.C. § 112

1. The Rejection

The Office Action rejected claims 1, 3, 5-11 and 17-20 under 35 USC § 112, first paragraph, as containing subject matter not sufficiently described in the specification. The rejection, in its entirety, stated:

> Claims 1, 3, 5-11 and 17-20 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention. Claims 1, 8, 17 and 18 which disclose "airflow travels around said object" and "directing airflow near said tarmac along said surface" is not described in the specification

The Examiner provided no further discussion of the rejection in the Office Action.

The Reply to the Office Action included rebuttal arguments why the specification provided an adequate written description. The Advisory Action dated 06 January 2004 ("Advisory Action"), however, did not respond to the rebuttal arguments.

2. Analysis

The Examiner must establish a *prima facie* case that the original disclosure lacks an adequate written description under 35 U.S.C. § 112, ¶ 1. Such a *prima facie* case requires the Examiner to "provid[e] reasons why a person skilled in the art at the time the application was filed would not have recognized that the inventor was in possession of the invention as claimed in view of the disclosure of the application as filed." M.P.E.P. § 2163 (*see* Part III, Section A).

If the Applicant rebuts the lack of written description rejection, the Examiner should "review the basis for the rejection in view of the record as a whole, including ... arguments and any evidence submitted by applicant." *Id* (*see* Part III, Section A). If the Examiner wishes to continue asserting the written description rejection, the Examiner should repeat the rejection and "fully respond to

applicant's rebuttal arguments, and properly treat any further showings submitted by applicant in the reply." *Id.*

The Examiner failed to do either.

(a) The *Prima Facie* Case

To establish a *prima facie* case, the Examiner must provide "reasons why a person skilled in the art at the time the application was filed would not have recognized that the inventor was in possession of the invention as claimed in view of the disclosure of the application as filed." MPEP § 2163. The Examiner failed to provide any such showing. Therefore, the Examiner failed to establish a *prima facie* case. For at least this reason, the rejection was improper and the Board must reverse the decision.

(b) The Response to the Rebuttal

Appellants rebutted the rejection by the Examiner in the Reply to the Office Action. However, the Examiner failed to provide any response to such rebuttal. Therefore, the Examiner failed to comply with the requirements of the MPEP. For at least this reason, the rejection was improper and the Board must reverse the decision.

(c) The Original Disclosure Provides Support

Putting aside the improper establishment of the *prima facie* case and the non-response to the rebuttal, the original disclosure does provide a written description for the language in amended claims 1, 8, 17 and 18. There is no *in haec verba* requirement between newly added claim features and the original disclosure. MPEP § 2163.01. Instead, newly added claim features can find express, implicit, or inherent support in the original disclosure to satisfy this requirement. *Id.* The airflow

traveling "around" (claims 1 and 17) or "along" (claims 2 and 18) the object finds express, implicit and inherent support in the original disclosure.

Figure 4 provides express support for these features. Figure 4 demonstrates such movement. The term "around" used in claims 1 and 17 connotes movement that avoids an object. The term "along" used in claims 8 and 18 connotes movement parallel, or close to, an object. In Figure 4, the dotted line closest to the tarmac T shows the airflow travelling along/around the ramp 101.

Paragraph 44 provides inherent support for these features. Paragraph 44 describes that the ramp facilitates "the turning of the airflow near the tarmac T towards the engine 15." The term "turn" also connotes movement in avoidance of an object. To "turn" as described in paragraph 44, the airflow would need to travel around/along the ramp.

Paragraph 56 provides implicit support for these features. Paragraph 56 describes an alternative embodiment in which the ramp 301 "could be formed (*e.g.* injection molded) with an internal chamber that receives ballast material such as water." One skilled in the art would recognize that the injection molded ramp 301 should have solid surfaces (*i.e.* without holes) to retain the ballast water within the inner chamber. These solid surfaces would deflect airflow around/along the ramp. For at least this reason, the rejection was improper and the Board must reverse the decision.

B. Rejection Under 35 U.S.C. § 102(b)

1. The Rejection

The Office Action rejected claims 1, 3, 6-9, 11-13 and 15-22 as being anticipated by United States Patent Number 6,162,011 to Gerhardt *et al.* ("Gerhardt").

2. Analysis

A reference anticipates a claim only when the reference describes each and every feature recited in the claim. MPEP § 2131. Gerhardt fails to disclose each and every feature recited in the rejected claims.

(a) Claims 1, 3, 6, 7 and 17

Independent claims 1 and 17 each recite, *inter alia*, that the airflow travels "around" the object. Gerhardt fails to disclose such feature. As described in column 5, lines 17-20 of Gerhardt, the apparatus prevents vortex formation by allowing "an after-flow of air ... to flow into the vortex core 4 of the vortex due to the air permeability of the surface 6A of the element 6." In other words, the air flows through (col. 4, l. 53) the element 6. Movement through an object is different than movement around an object. As discussed above, the term "around" connotes a course that avoids an object.

The Examiner tried to clarify how Gerhardt disclosed airflow traveling around the object by directing Applicants to Figure 3. This interpretation is incorrect. The "emanating" (col. 5, l. 46) airflow 13 comes from within the element. The emanating airflow does not travel along the element. Figure 4 clearly shows that the emanating airflow 13 exits from the interior of the apparatus.

None of the remaining cited references provide a motivation for such a modification. The rejection was improper and the Board must reverse the decision of the Examiner.

(b) Claims 8, 9 and 11

Independent claim 8 recites, *inter alia*, that the airflow travels "along" the object. Gerhardt fails to disclose such feature. As described above, the apparatus of Gerhardt propels air through the air permeable surface 6A. Movement through an object is different than movement along an object.

As discussed above, the term "along" denotes a course parallel and close to an object. None of the remaining cited references provide a motivation for such a modification. In light of the foregoing, the rejection was improper and the Board must reverse the decision of the Examiner.

(c) Claims 12, 13, 15 and 16

Independent claim 12 recites, *inter alia*, that the object "turns" airflow near the tarmac towards the engine. Gerhardt fails to disclose or to suggest such feature. Again, Gerhardt merely allows the air to travel through the permeable element. The term "turns" denotes a course that deviates. When passing through a permeable element, no deviation occurs. None of the remaining cited references provide a motivation for such a modification. The rejection was improper and the Board must reverse the decision of the Examiner.

(d) Claims 18 and 20

Independent claim 18 recites, *inter alia*, that the airflow travels "along" the inclined surface. As discussed above with reference to independent claim 8, Gerhardt fails to disclose such feature. Gerhardt propels air through the air permeable surface 6A, not on a course parallel and close to an object, as the claim term "along" connotes. For at least this reason, the rejection was improper and the Board must reverse the decision of the Examiner.

Independent claim 18 also recites that the suppressor includes an "inclined" surface. Gerhardt fails to disclose such a feature. The Examiner alleges that the chamber walls 8 are "inclined." As seen in Figure 3 of Gerhardt, the chamber walls extend vertically. None of the remaining cited references provide a motivation for such modifications. The rejection was improper and the Board must reverse the decision of the Examiner.

(e) Claim 19

Dependent claim 19 recites that the angle of the inclined surface described in independent claim 18 is "approximately 45°." The Examiner **disregarded** such feature and failed to address this feature in the Office Action. In fact, the Examiner only used forty two (42) words to reject claims 18-22. In its entirety, the Office Action stated "[r]egarding claims 18-22, a base 7 faces the tarmac 3, an inclined surface 8, 9 extends in a direction from the tarmac towards the inlet (See Fig. 3) and a portable suppressor prevents formation of the vortex (See Col. 6, lines 6-14)." This discussion does not identify which feature of Gerhardt has an inclined surface of approximately 45°. For at least this reason, the rejection was improper and the Board must reverse the decision of the Examiner.

Putting aside such failure, Gerhardt fails to show an inclined surface at "approximately 45°." Gerhardt only shows a vertical chamber wall. None of the remaining cited references provide a motivation for such modifications. The rejection was improper and the Board must reverse the decision of the Examiner.

(f) Claims 21 and 22

Independent claim 21 recites that the suppressor includes an "inclined" surface. As described above with respect to claim 18, Gerhardt fails to disclose such a feature. The vertical chamber walls 8 of Gerhardt are not inclined.

Claim 21 also recites that the height of the inclined surface ranges "between approximately (2h-D)/8 and (2h-D)/4." The Examiner has **disregarded** these claimed features and failed to address such features in the Office Action. For at least this reason, the rejection was improper and the Board must reverse the decision of the Examiner.

Gerhardt lacks even a general discussion of a range of sizes for the apparatus, let alone a range of sizes having a specific mathematical relationship to the engine centerline height (h) and engine inlet diameter (D). None of the remaining cited references provide a motivation for such modifications. The rejection was improper and the Board must reverse the decision of the Examiner.

C. Rejection Under 35 U.S.C. § 103(a)

1. The Rejection

The Office Action rejected claims 5, 10 and 14 as being unpatentable over Gerhardt in view of United States Patent Number 5,591,904 to Schafhaupt *et al.* ("Schafhaupt").

2. Analysis

An Examiner must satisfy three (3) criteria to establish a *prima facie* case of obviousness. MPEP § 2142. First, a motivation must exist to combine reference teachings. *Id.* Second, the combination of references must have a reasonable expectation of success. *Id.* Finally, the references must teach or suggest all of the claimed features. *Id.*

Gerhardt and Schafhaupt do not teach or suggest all of the claimed features. As described above, Gerhardt failed to disclose all of the features of independent claims 1, 8 and 12, from which claims 5, 10 and 14 depend. Specifically, Gerhardt failed to disclose that the airflow travels "around" the object (claim 1), that the airflow travels "along" the object (claim 8) and that the object "turns" airflow near the tarmac towards the engine (claim 12).

Schafhaupt fails to overcome the shortcomings of Gerhardt. Similar to Gerhardt, Schafhaupt discloses an apparatus having gratings 9 through which air can exit the apparatus to prevent vortex

formation. The grating allows the air to pass through the apparatus, not "around" or "along" the apparatus as provided in claims 1 and 8. Likewise, by passing through the apparatus, the air does not "turn" as provided in claim 12. None of the remaining cited references overcome the shortcomings of Gerhardt and Schafhaupt. The rejection was improper and the Board must reverse the decision of the Examiner.

IX. CONCLUSION

In light of the foregoing, Appellants submit that the rejections to claims 1, 3 and 5-22 were improper. Appellants request that the Board reverse the decision of the Examiner.

APPENDIX A
CLAIMS INVOLVED IN APPEAL

1. A method of operating a gas turbine engine for testing, comprising the steps of:

providing an aircraft on a tarmac, said aircraft having a gas turbine engine with an inlet;

selecting a power setting for said engine that is capable of producing a vortex between said inlet and said tarmac; and

placing an object between said inlet and said tarmac;

wherein airflow travels around said object to inhibit formation of said vortex.

3. The method of claim 1, wherein said placing step comprises removably placing said object between said inlet and said tarmac.

5. The method of claim 1, wherein said engine is located on a wing of said aircraft.

6. The method of claim 1, wherein said aircraft remains static on said tarmac while testing said engine.

7. The method of claim 1, wherein said power setting comprises up to a full power setting.

8. A method of preventing vortex formation, comprising the steps of:

providing an aircraft on a tarmac, said aircraft having a gas turbine engine with an inlet;

operating said engine;

determining whether said operating step is likely to produce a vortex between said inlet and said tarmac;

placing an object between said tarmac and said inlet should said determining step indicate a likelihood of said vortex, said object having a surface; and

directing airflow near said tarmac along said surface of said object towards said engine to inhibit vortex formation.

9. The method of claim 8, wherein said placing step comprises removably placing said object between said tarmac and said inlet.

10. The method of claim 8, wherein said engine is located on a wing of said aircraft.

11. The method of claim 8, wherein said operating step occurs while said aircraft remains static on said tarmac.

12. A method of operating a gas turbine engine mounted on an aircraft located on a tarmac at an elevated engine pressure ratio (EPR) greater than a threshold EPR, comprising the steps of:

placing an object between said tarmac and said engine to turn airflow near said tarmac towards said engine; and

operating said engine at said elevated EPR;

wherein, without said object, operating said engine at said threshold EPR would not create an inlet vortex, but operating said engine at said elevated EPR would create said inlet vortex.

13. The method of claim 12, wherein said placing step comprises removably placing said object between said tarmac and said engine.

14. The method of claim 12, wherein said engine is located on a wing of said aircraft.

15. The method of claim 12, wherein said operating step occurs while said aircraft remains static on said tarmac.

16. The method of claim 12, wherein said elevated EPR is up to a full power setting.

17. In a method of performing a test including a step of operating a gas turbine engine at an engine pressure ratio that typically requires removing said engine from an aircraft located on a tarmac and placing said engine on a test stand, wherein the improvement comprises positioning a movable object between said engine and said tarmac so that airflow travels around said object to allow said engine to remain on said aircraft for said test.

18. A suppressor for preventing a vortex between an inlet of a gas turbine engine on an aircraft and a tarmac, comprising:

a base facing said tarmac; and

an inclined surface extending in a direction from said tarmac towards said inlet at an angle to said base;

wherein airflow near said tarmac travels along said inclined surface towards said inlet so that said suppressor prevents formation of said vortex.

19. The suppressor of claim 18, wherein said angle is approximately 45°.

20. The suppressor of claim 18, wherein said suppressor is portable.

21. A suppressor for preventing a vortex between an inlet of a gas turbine engine on an aircraft and a tarmac, said engine having a centerline height (h) and said inlet having a diameter (D), the suppressor:

a base; and

an inclined surface extending from said base;

wherein said inclined surface has a height (w) ranging between approximately (2h-D)/8 and (2h-D)/4 to prevent formation of said vortex.

22. The suppressor of claim 21, wherein h/D is less than approximately 2.5.